



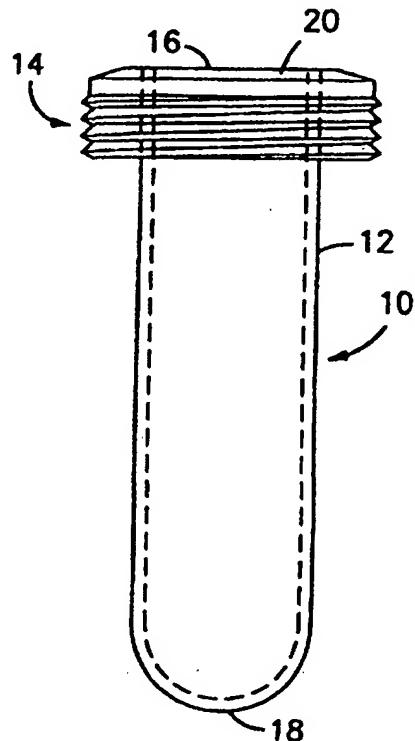
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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## (54) Title: PREFORM AND CLOSURE FOR BLOW MOLDED ARTICLES

## (57) Abstract

A preform, a process for forming the preform and a container formed from the preform are disclosed. The preform comprises a tubular body portion (12) having an open end (16) and a closed end (18). At a location near the open end (16), a flange (20) extends outwardly from the tubular body portion (12). A closure retaining element (14) is provided for engaging a closure. The closure retaining element (14) is formed separately from the tubular body portion (12) and includes a manner for attachment to the tubular body portion (12). The closure retaining element (14) is attached to the tubular body portion (12) adjacent the flange (20) via the manner for attachment.



**TITLE: PREFORM AND CLOSURE FOR BLOW MOLDED ARTICLES**

**BACKGROUND OF THE INVENTION**

This invention is directed to preforms and containers, and more particularly, to a simplified preform assembly including a preform having a shape and design devoid of finish moldings.

The typical preform has an outer surface including a finish which comprises moldings such as threads and a flange. Such a preform is shown in U.S. Patent No. 4,950,514 to Strassheimer. The preform has an outside wall face with external threads and a flange. Accordingly, the preform as shown includes the typical finish moldings which, in order to mold, requires the use of a parted neck mold component, termed the neck split. Preforms could be molded at lower packing pressure, and more mold impressions could be accommodated in the same mold platen without the neck splits, since the operation of molding using neck splits requires substantially more platen space than a molding operation without neck splits.

There exists a need, therefore, for a preform having a simplified body structure, that is, with no finish requiring the use of a parted neck mold component, for allowing for the formation of preforms at lower packing pressure and for allowing for the molding of preforms in greater number on the same platen.

**SUMMARY OF THE INVENTION**

The primary object of this invention is to provide a simplified preform which includes a body portion having a partial neck finish, to which a separately prepared portion of neck finish is assembled to complete the neck finish.

Another object of this invention is to provide a simplified preform wherein the body portion thereof includes only a flange and the partial neck finish thereof is provided via the separately molded portion of the neck finish in the form of a closure retaining device used with the preform for retaining a closure on a container.

Still another object of this invention is to provide a process for forming a preform wherein the preform is formed from two separate components, one component providing the body

The details of the present invention are set out in the following description and drawings wherein like reference characters depict like elements.

BRIEF DESCRIPTION OF THE DRAWINGS

5 FIG. 1 is an elevational view of a preform in accordance with the principles of the present invention including both components thereof;

FIG. 2 is an elevational view of a first component of the preform of the present invention;

10 FIG. 3 show a top view of a second component of the preform of the present invention;

FIG. 3A is a cross-sectional view of the second component shown in FIG. 3 taken along line 3A-3A;

15 FIG. 4 is an elevational and partially cross-sectional view of a container formed in accordance with the first and second components shown in FIGS. 2 and 3;

FIG. 5 is a schematic view of a mold cavity, mold core, and preform transport tube in accordance with the principles of the present invention;

20 FIG. 6 is another embodiment of a method for molding the finish component of the preform of the present invention;

FIG. 6A is a cross-sectional enlarged view of the area 6A of the finish component in accordance with the method of FIG. 6; and

25 FIG. 6B is an enlarged view of the finish component of FIG. 6 in the closed configuration with the free edges shown in FIG. 6 joined.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail, there is shown in  
30 FIG. 1 an elevational view of a preform in accordance with the principles of the present invention, which is designated generally as 10. Preform 10 includes two components, a body 12 and a finish 14. As shown in FIG. 1, finish 14 is adapted to engage body 12.

35 Referring now to FIG. 2, body 12 of preform 10 is preferably tubular in shape having an open end 16 and a closed

container 42 and container 42 is filled. Closure 40 has a typical cap shape, including an upper wall 44 and a circumferential wall 46 extending from upper wall 44 and defining the circumference of closure 40. On inner surface 48 of circumferential wall 46, an inner thread 50 is formed for engagement with outer thread 30 of finish 14. Concentric to circumferential wall 46, an inner ring 52 may be provided, extending from upper wall 44 in the same direction as circumferential wall 46, spaced inwardly therefrom. A space 54, indicated by an arrow, is defined between circumferential wall 46 and inner ring 52 which space is sufficient in width to receive the thickness of flange 20 of preform 10 and to allow cap 44 to be brought into sealing engagement with upper surface 22 of the flange. Accordingly, upon moving closure 40 onto finish 14 by turning and the engagement of threads 30 and 50, the closure is forced downwardly against upper surface 22 of flange 20 while the engagement of threads 30 and 50 cause finish 14 to be pulled upwardly against serrations 37 of flange 20. By this arrangement of threads 30 and 50, finish 14 is held securely against flange 20. Based on the pressure of the closure on the upper surface 22 of flange 20, a seal is formed such that a fluid is prevented from escaping the container made from preform 10.

In forming preform 10, body portion 12 is injection or otherwise molded from a plastic material, such as PET. As discussed, body portion 12 is devoid of all finish with the exception of a flange, such that no external threads or the like are molded thereon for retaining a closure. Accordingly, during molding the use of a parted mold component or neck split is avoided, thereby allowing for lower molding pressure to be used and more mold impressions to be accommodated on the same platen, as discussed above.

Further, finish 14 is formed separately from body portion 12, preferably through a molding operation similar to that used with body 12 or other pressure molding processes. It may be made from the same material as body 12, but may also be made advantageously from other materials. Thus, a compressible, elastic material, e.g., an elastomer, such as polyurethane or

assembly is complete when preform 10 is removed from tube 60 for transfer to a blow mold. A seal is formed via closure 40 on container 42, and if necessary, may be enhanced by finish 14 formed from an elastomeric material, as above.

5 As above described, finish 14 is a ring with threads on its outer surface. It may be pressure molded in that shape, however, a mold for that purpose must have many mold impressions to be economically operable. In a multiple array, such a mold is expensive because its thread forming elements  
10 require operating means which take up a great amount of space in the mold. For greater economy, the ring, i.e., finish 14, may be molded in the open or split configuration, as shown in FIGS. 6 and 6A. Accordingly, two semi-circular portions are molded, with their convex faces carrying corresponding portions of  
15 thread 30. In use, the two semi-circles are closed into a ring, i.e., finish 14, as shown in FIG. 3, before the same is applied to body 12 of preform 10. To facilitate closing the ring, hinge 59 may be provided, shown enlarged in FIG. 6A. The surfaces 63a and 63b along which the semi-circles are joined may be parallel  
20 to the ring axis as shown by the dotted lines in FIG. 6B, or angled, as shown by the solid lines in FIG. 6B, to provide a larger matching area that is self aligning to improve the sealing properties of the ring. It is readily seen that the mold in which the joined semi-circles are used is much simpler  
25 than the one for a ring, in that the thread forming part does not have to be separately movable. Also, the shape lends itself to more economical methods than injection molding, e.g., compression molding and thermoforming. The two semi-circles may of course also be separately molded and subsequently assembled  
30 into the ring shape.

The primary advantage of this invention is that a simplified preform is provided which includes a body portion having a minimal neck finish. Another advantage of this invention is that a simplified preform is provided wherein the body thereof includes only a flange and wherein a separately molded closure retaining device is used with the preform for retaining a closure on a container. Still another advantage of this invention is that a process is provided for forming a

WHAT IS CLAIMED IS:

1. A preform, comprising:  
a tubular body portion (12) having an open end (16) and a closed end (18); and  
a closure retaining means (14) for engaging a closure (40), said closure retaining means formed separately from said tubular body portion (12) and including means for attachment (24, 26) to said tubular body portion (12), said closure retaining means (14) attached to said tubular body portion (12) adjacent said open end (16) via said means for attachment.
2. A preform according to claim 1, including a flange (20) extending outwardly from said tubular body portion (12) at a location near said open end (16), wherein said closure retaining means (14) is attached to said tubular body portion (12) adjacent said flange (20) via said means for attachment (24, 26).
3. The preform according to claim 2, further including means (36, 37) for preventing rotation of said closure retaining means (14) relative said tubular body portion (12).
4. The preform according to claim 3, wherein said means for preventing rotation (36, 37) is comprised of interlocking surfaces provided on each of said flange (20) and said closure retaining means (14), said interlocking surfaces adapted to engage and prevent relative rotation.
5. The preform according to claim 2, wherein said means for attachment (24, 26) comprises said closure retaining means (14) including an opening (24) in which said tubular body portion is inserted, said opening having a size for causing an interference fit between said closure retaining means (14) and said tubular body portion (12).

14. A process for forming a preform, comprising the steps of:

forming a preform body portion (12) having an open end (16) and a closed end (18);

forming separately from said body portion a means for engaging a closure (14), said means for engaging including means for attachment (24, 26) to said preform body portion (12); and

attaching said means for engaging to said preform body portion via said means for attachment.

15. The process according to claim 14, further including the step of preventing said means for engaging from rotating relative said preform body portion.

16. The process according to claim 15, wherein said step of preventing includes interlocking mating surfaces of said preform body portion and said means for engaging.

17. The process according to claim 14, wherein said step of forming a preform body portion further includes forming a flange near said open end of said body portion.

18. The process according to claim 17, wherein said step of attaching includes pressure fitting said means for engaging on said body portion until said means for engaging abuts said flange.

19. The process according to claim 14, wherein said step of forming separately said means for engaging includes forming said means for engaging as two halves.

20. The process according to claim 19, wherein during said step of forming separately said means for engaging, said two halves are formed connected together.

21. The process according to claim 19, further comprising the step of attaching said two halves together to form said means for engaging.

28. The container according to claim 25, wherein said closure engaging means comprises an outer thread and said retainer engaging means comprises an inner thread, wherein said outer and inner threads are mating threads for attaching said closure to said means for retaining.

29. The container according to claim 24, wherein said means for retaining is separately formed and said means for engaging comprises an opening in said means for retaining, wherein said neck is positioned in said opening.

30. The container according to claim 24, wherein said flange and said means for retaining have interlocking surfaces for preventing rotation of said means for retaining relative said flange.

31. The container according to claim 24, wherein said means for retaining includes means for creating a seal.

32. The container according to claim 31, wherein said means for creating a seal comprises said means for retaining formed from an elastomeric material.

33. The container according to claim 24, wherein said means for retaining comprises two connected halves, said halves having an open and a closed configuration, wherein said halves are molded in said open configuration and form said means for retaining in said closed configuration.

34. The container according to claim 33, wherein each of said halves are semi-circular in shape and said closure engaging means comprises each of said halves having closure engaging surfaces, said halves connected by a hinge.

14. A process for forming a preform, comprising the steps of:

forming a preform body portion (12) having an open end (16) and a closed end (18) and a substantially flat surface adjacent said open end;

forming separately from said body portion a means for engaging a closure (14), said means for engaging including means for attachment (24, 26) to said preform body portion (12); and

attaching said means for engaging to said preform body portion via said means for attachment, and retaining said means for engaging on said tubular body portion by an interference fit adjacent said open end.

15. The process according to claim 14, further including the step of preventing said means for engaging from rotating relative said preform body portion.

16. The process according to claim 15, wherein said step of preventing includes interlocking mating surfaces of said preform body portion and said means for engaging.

17. The process according to claim 14, wherein said step of forming a preform body portion further includes forming a flange near said open end of said body portion.

18. The process according to claim 17, wherein said step of attaching includes pressure fitting said means for engaging on said body portion until said means for engaging abuts said flange.

19. The process according to claim 14, wherein said step of forming separately said means for engaging includes forming said means for engaging as two halves.

20. The process according to claim 19, wherein during said step of forming separately said means for engaging, said two halves are formed connected together.

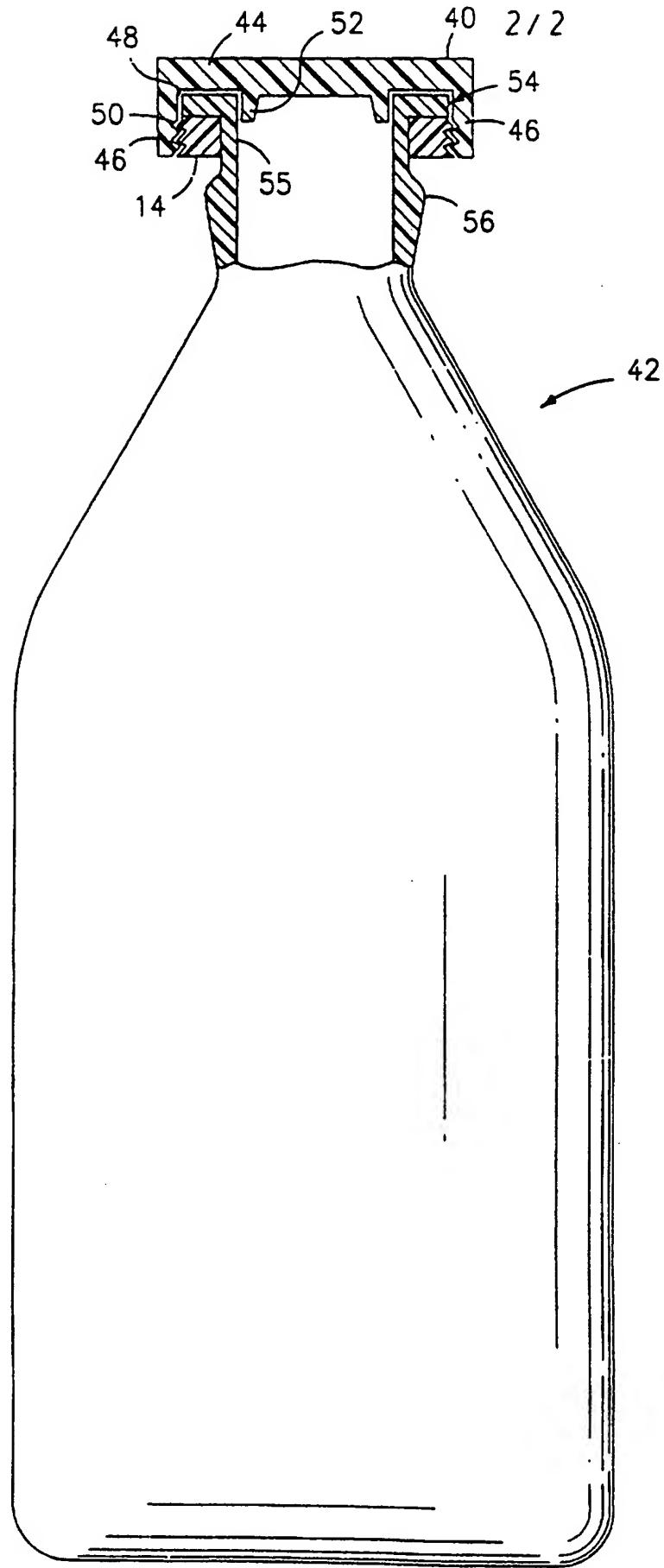


FIG. 4

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US96/20658

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---	US 3,899,096 A (MARCO) 12 AUGUST 1975, see entire document, especially Figure 4.	24-29 -----
Y		30-34
X ---	US 3,603,472 A (LECINSKI, JR. ET AL) 07 SEPTEMBER 1971, see entire document, especially Figure 1.	23-26, 28, 29 -----
Y		27, 31-34
X ---	US 4,576,296 A (LECINSKI) 18 MARCH 1986, see entire document, especially Figure 4.	23-25, 28-30 ----- 3, 4, 15, 16, 18, 31-34
Y		
X	JP 60-17693 A (YOSHINO KOGYOSHO) 04 MAY 1985, see Figures 1-3.	1, 2, 6-9, 23-26, 28, 29
Y	US 5,174,460 A (MINNETTE) 29 DECEMBER 1992, see Figure 2.	27
Y	FR 1,417,199 A (SZMARAGD) 04 OCTOBER 1965, see Figures 3 and 4.	10, 11, 31, 32
Y	US 68,456 A (PRESCOTT) 03 SEPTEMBER 1867, see Figures 1, 2 and 4.	19, 21, 22, 33, 34
A	US 3,486,654 A (SCHELLHAS) 30 DECEMBER 1969	23-34
A	US 5,447,766 A (ORIMOTO ET AL) 05 SEPTEMBER 1995	1-13
A	US 3,894,331 A (RAGETTLI) 15 JULY 1975	23-34
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